

Industrial design as a factor for innovation and competitiveness

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This article aims to convey the strategic importance of industrial design in aspects related to competitiveness and company success within the context of the industrial fabric. It also studies the Spanish manufacturing industry, with particular emphasis on Catalan industry, related to the application of design factors. The text also comments on the two most significant factors of the study promoted by CIDEM (1): market success and design (2).

Professor Josep Tresserras speaks about industrial design as a key factor for innovation and competitiveness of Spanish and particularly Catalan firms, highlighting its strategic importance and suggesting that society at large should attain a more committed and consolidated knowledge and culture of product design and innovation. These are key aspects at a time when the industrial fabric is facing the challenges of globalisation.

Tresserras also includes an analysis of the study *Market Success and Design*¹ promoted by CIDEM², which observes and evaluates the presence of design and innovation as relevant factors in the results of a series of firms, on the basis of their behaviour.

Competitive context

In the last few years, European companies, especially those producing manufactured goods, have been suffering from strong competition, particularly from Asian countries and especially China. This new situation has led to a growing loss of competitiveness in European companies, at the same time as encouraging numerous firms to relocate, mostly to China, leading to great difficulties in the industrial and social fabric. The global economy has also become more firmly established, as well as the internationalisation of markets and the predominance of strategic competition over classic natural competition. This new situation has displaced approaches related to strategies focusing on comparative

¹ Tresserras, Josep. / Verdaguer, Narcis / Espinach, X (2005), *Èxit de mercat i disseny*. CIDEM. Barcelona.

² CIDEM: Centre of Innovation and Business Development, reporting to the Department of Work and Industry of the government of Catalonia.

advantages and productivity, which have lost validity as decisive factors in competitiveness.

This new scenario means that we must urgently focus on competitive strategies that generate activities where creativity, knowledge, the intellectual capacity of firms, innovation, industrial design, communication, brands and customer service are all factors that can generate competitive advantage and allow the European industrial fabric to survive.

Industrial design is among the different factors that enable the evident attainment of competitive advantage, which can add differentials to products and consequently increase their value as perceived by consumers, not only tangibly but also intangibly. Industrial design is, in fact, a privileged protagonist in all competitive strategy.

When we speak of the intangible values generated by product design, we could mention the identity of the company, brand and product, without forgetting aspects related to the communication between the product and user, closely related to the sensations and visual perception conveyed by the product configuration which often leads to a decision to buy.

Product design is a highly valuable activity in generating products provided it is appropriately structured in relation to the other factors, ensuring a high degree of differentiation is achieved. In other words, design cannot generally be considered as an end in itself but rather as another means of generating an objective: i.e. a new product that includes innovative aspects which can lead to competitive advantages in a market where supply exceeds demand. In some particular cases of products, however, design in itself is a value, classic examples being firms such as Alessi, Swatch, Bang & Olufsen and Grohe, among others.

In the future, the management of knowledge, industrial design and innovation will appear among the priorities of

SME's as basic tools to improve competitiveness, as tools to maintain or improve their positioning in the market.

Among the different kinds of industrial design, that related to the product is the one with greatest influence on the industrial fabric at a horizontal level and on which most of this article will focus.

Product design has two highly distinct lines that are not normally differentiated; the line known as constitutive design and that defined as innovative design. Below I will outline their fields of application.

Constitutive design

An activity integrated into all project action as a response to aspects related to the product's formal configuration, from a strictly technical point of view, conditioned by requirements concerning the materials, manufacture, assembly, functionality and safety. This activity has always been present throughout the process of product generation. In many cases, it is not carried out by designers and those who include it often do not associate it with the specific activity of product design.

Innovative design

Considered to be a factor that generates differentials that, by means of activities related to conceptualisation and creativity, generate values appreciated by consumers, taking into account different requirements and not only those related to the constitutive design (although these complement each other) and which actually lead to competitive advantage.

In fact, in innovative design *per se* there is a specific project-related action of design within the process of product development, with great demands in the field of conceptualisation, communication and creativity. In the case of constitutive design, the activity is clearly operational, based on explicit knowledge, where we can

say that the current division of labour appears. But we must not, as a result, underestimate or ignore this activity, which plays an important part in the structure of product generation, although I believe it does not have a strategic importance, as the knowledge applied can be considered to a certain extent as explicit and relatively easy to assimilate.

The differentiated solutions in the formal definition of a product are related to aesthetic aspects, those of form and function, communication and packaging. Without forgetting aspects related to consumers' new uses and needs, to interaction with new technologies and the inclusion of innovative solutions compatible with sustainability and the environment.

Catalan companies facing the challenge of incorporating product design as a competitive advantage

Industrial activity in Catalonia has undergone huge changes since the crisis of 1973 and that of post-1992. At this time, manufacturers invested a great deal of effort in maintaining their position, applying their energies to implementing or improving their quality standards comparable to the leading companies of their respective sectors, applying production optimisation policies in all their aspects and improving organisation and management, resulting in higher productivity with high levels of quality and reliability.

In fact, somewhat post-Taylor solutions were applied that momentarily managed to reduce the problem, although these solutions turned out to be insufficient in the medium term. However, I do not wish to say that the actions

applied were erroneous, but rather that there should have been a parallel investment in policies focused on the field of innovation with a global nature and with particular emphasis on the specifics of product generation.

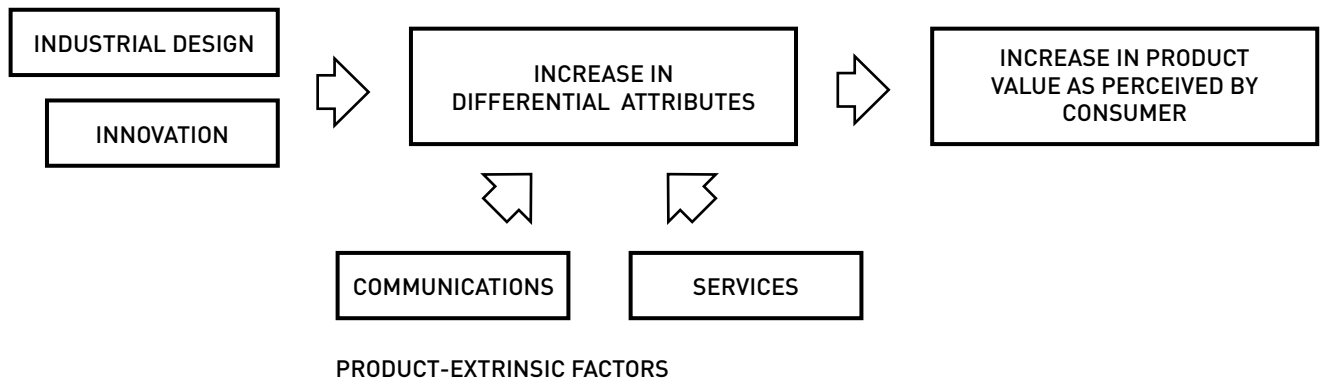
At the time, the efforts made were repaid by an increase in exports and gradual increases in company results, a consequence of the reduction in costs and the overall improvement of products within the context of productivity, also helped by some comparative advantages that are still valid today, such as the change in the peseta and the cost of labour for intensive work. The significant improvement in organisation and business management also had a great effect.

However, for about the last five years this situation has been changing, with a steady loss of competitiveness being observed and, lately, the exports of products slowing up, with the trade balance deficit increasing. The advantages secured previously are disappearing, actions becoming necessary to remain in the market and the need emerging to focus on product innovation and its different lines, such as: technology, design, communication and service, within a more flexible and decentralised business context. This effort may help to increase competitiveness, although it means that new paradigms must be proposed.

This new scenario entails more difficulty than the challenge taken on in the crisis of '92. Product innovation is not simply the application of methods and systems, i.e. applying explicit knowledge complemented with higher investment, but rather requires greater efforts in R&D&I, as well as encouraging the intellectual capacity of the company based on previous business experience and

Figure 1. Factors generating competitive advantages in products.

PRODUCT-INTRINSIC FACTORS



the knowledge of professionals (true protagonists in the current post-industrial society).

One aspect that makes this new challenge difficult in Catalonia is the lack of tradition in carrying out and applying R&D&I. The current structure and organisation do not reach an average level compared with all the countries in the EEC as a whole, making it difficult for manufacturing firms to achieve high levels of efficiency and profitability.

Similarly, the limited culture and experience (particularly in SME's) in projects for products and design, from a competitive and strategic point of view, has also been a drawback. However, efforts have been made to apply active policies in innovation and product design, both at an institutional, business and university level, to reduce the current situation (although numerous people believe that this has not happened enough).

At present, the implementation of policies focused on gestures or desires is not sufficient to improve levels of

competitiveness and business survival, rather they need to focus on definite actions based on strong structural and investment supports, reinforcing global strategies for improvement and innovation. Otherwise, in the medium term we may find ourselves faced with an emergency regarding the survival of our industrial fabric, particularly in the manufactured goods sector.

Given this situation, product design emerges as a decisive factor in all innovation policy, as it can no longer be treated within the industrial context as an isolated act, unrelated to the overall project activities and, even less so, be associated exclusively with an artistic, cultural or leisure activity. As Dr. N. Teymur has said, "economic relations are the only reason for the activity of designing objects they produce and some designers hide this relation or reduce it to a relation existing as a necessary evil". I believe that the treatment carried out of industrial design in the 90's on the part of institutions and the media conveyed a view of the activity that was distanced from the industrial reality and, as a result, companies did not fully identify with this and

consequently underestimated, in general, the possibilities of industrial design as a factor of innovation.

There is actually a need to make more effort regarding the generalisation of product design knowledge and its possibilities, and below I explain the different actions I think are of the utmost priority in order to improve its application:

- Optimising organisation and management.
- Consolidating and furthering the processes and methodologies of product design.
- Strengthening design and product strategies and programmes.
- Promoting in-depth knowledge of the activity and possibilities of designers.
- Increasing general training and specific training in companies.
- Encouraging professional retraining of industrial designers to achieve greater interaction with industrial firms.
- Creating a supply of professionals specific to design management and product innovation.que formen part de tots els residus d'envasos generats, amb un mínim d'un 15% en pes de cada material envasat.
- Conveying to society at large the importance of product design and its integration in companies, i.e. creating a specific culture.

Increasing competitiveness and improving company results by applying product design strategies

Several economists, specialists in innovation and competitiveness, as well as public and private institutions have tried to make the economic benefits of product design more tangible.

There are difficulties in precisely defining some specific results, partly due to the difficulty of attributing specific items. The existence of tangible and intangible values

in the results also leads to a complex situation. Another aspect is that companies are also not clear as to where the boundaries lie between product engineering and product design.

In my view, I believe that finding absolute values of an economic order comparable to those used in business accounting that can be standardised throughout all kinds of firms is something that is difficult and without any practical value, "The search for precision in figures is usually like a decoy: it is better to have a precise but pertinent figure (in other words, fast) than a precise figure that is not suitable for action" [3] and, as John Maynard Keynes said, "It is necessary to stop being precisely wrong and start being vaguely correct ...".

In principle, it seems to be accepted by all forums that investment in design improves company competitiveness and facilitates short-term returns on investment, although gaps and dispersions appear when this area is analysed more deeply that do not help a specific analysis and its later evaluation, consequently making it difficult to take decisions.

However, there are improvements in products that increase their value and can be a direct consequence of applying design of an innovative nature, the most outstanding examples being as follows:

- Improvements in product communication.
- New solutions in assembly, use, maintenance and repair.
- Strengthening the product's character and perceived quality.
- Strengthening the brand and range of design.
- Improvements in the dual form-function and in functional safety.
- New responses to functions or needs of consumers.
- More environment-friendly solutions.

Given the growing importance of product design in firms, CIDEM, concerned about this situation, decided to carry out a study entitled “*Market success and design*” (4) whose aim was to explore the status of design in Catalan SME’s with regard to their success in the market and to analyse their quantitative and qualitative profitability.

The study’s findings were contained in a document intended for reflection and reference on the part of firms and public and private institutions, a guideline for future action. The Centre for Innovation and Conceptual New Product Development of the University of Girona was asked to carry out the study. The section below provides a concise explanation of the research completed in April 2005.

Comments on the “Market Success and Design” study

The study’s main aim was to establish whether there was a causal relationship between the application of product design and a company’s success in the market, i.e. to test whether efforts made in product design were profitable.

Within the main objective, the following areas were emphasised:

- Characterisation of the design process in Catalan SME’s.
- Relating a company’s reasons for success with the role of design.
- Reflecting on the need for a commitment to design.

As a point of departure, a round table was held with professionals linked directly or more indirectly with the activities of product development and design in order to define a common framework of knowledge, to clarify

concepts and discuss the study’s initial hypothesis, as well as to establish the basis for creating the forms for carrying out personalised interviews with 70 Catalan SME’s, the main core of the study. Professionals of renowned prestige were also interviewed concerning their opinion.

The findings have resulted in both a quantitative and qualitative valuation of the surveys carried out with the companies (main core of the study), followed by a summary of the opinions of the professionals interviewed and, lastly, the opinions and recommendations of the team carrying out the study.

Concerning the choice of firms, these were selected from SME’s that manufacture products in different sectors, defined as being successful in the market based on the following criteria:

- A minimum sales figure for the last year of between 2.5 and 40 million euros.
- Sustained growth in sales: an increase in the sales figures over the last three years with a minimum year-on-year increase of 8%.
- Sustained growth in profitability: economic profitability over the last three years with an annual minimum of 5%.

The survey was divided into different sections:

- Company data.
- Characterisation of the sector where the activity is carried out.
- Company characteristics.
- The company’s design process.
- Design knowledge and experience.
- Results from applying design.
- Relations with institutions.

³ Lorino, Philippe (1993), *El control de gestión estratégico*. Marcombo-Boixareu editores, Barcelona.

The following section explains the most significant aspects of the study's findings:

Regarding the benefits deriving from the application of design in firms

This section explains the most notable aspects of the study regarding the benefits and advantages of incorporating design in product generation.

The application of design in actions related to the generation of new products is seen as a factor for success, particularly in firms producing goods for mature and supply markets, their sales figures increasing by just over 10%. Many of the companies interviewed (23%) state that the application of specific design factors has allowed them to increase significantly their volume of exports, with increases higher than 10%. (Fig.3)

The companies feel that the application of design factors has helped them to strengthen some intangible aspects, such as: consolidating or strengthening the identity of the company, brand or product, as well as perceived quality. 70% of the firms consider the contribution of design as important in increasing intangible aspects. (Fig.4)

In general, an evident improvement can be observed in the income statement due to the application of product design. Design still has some way to go in terms of its application to a greater number of companies, as well as intensifying and extending its activities in firms using it in a structured way in new product development.

In principle, these economic data would be the most relevant data from the study, but there are also other

Figure 2. Increases in sales resulting from the application of design.

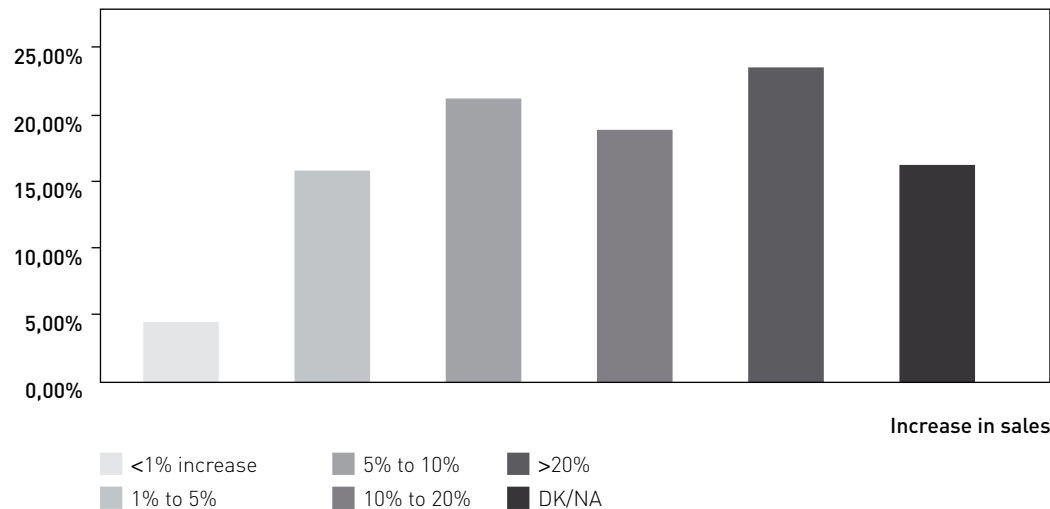
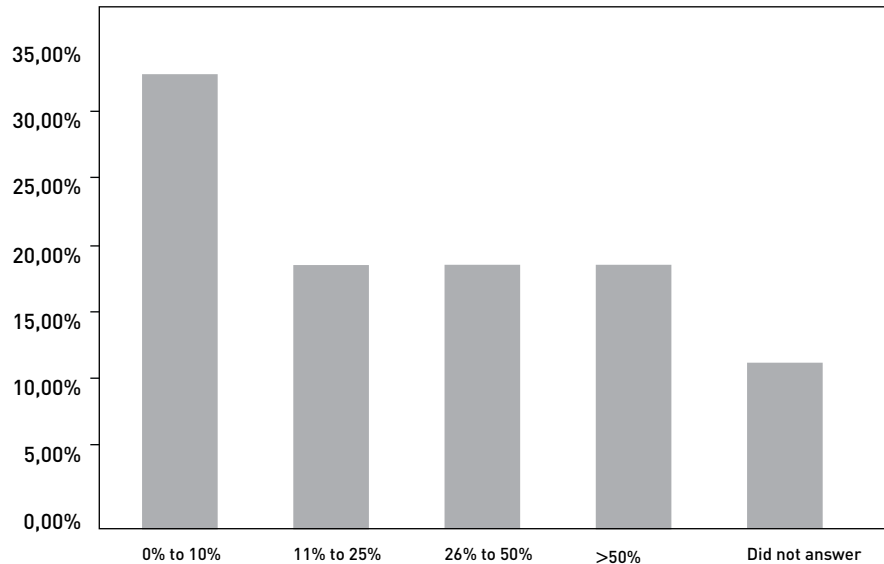


Figure 3. % Exports compared to production.



aspects I believe to be important and that deserve consideration, as explained below.

Regarding design knowledge and experiences on the part of companies

In general, the companies in the study are very clear about the advantages of applying design in products and the interrelation with product engineering. However, 30% state that they are not so clear about the boundary between design and engineering. Among these firms, those operating with fast-moving consumer goods (FMCG) and those operating with industrial systems have a better understanding of the difference between design and engineering.

Most of the companies state that they do not have design professionals on their staff but know external design professionals and teams, in general stating that they are satisfied with the external professionals they have used (approximately 54.5%, and 31.5% where the relationship has been acceptable).

With respect to unsatisfactory situations, the following comments stand out on the part of companies:

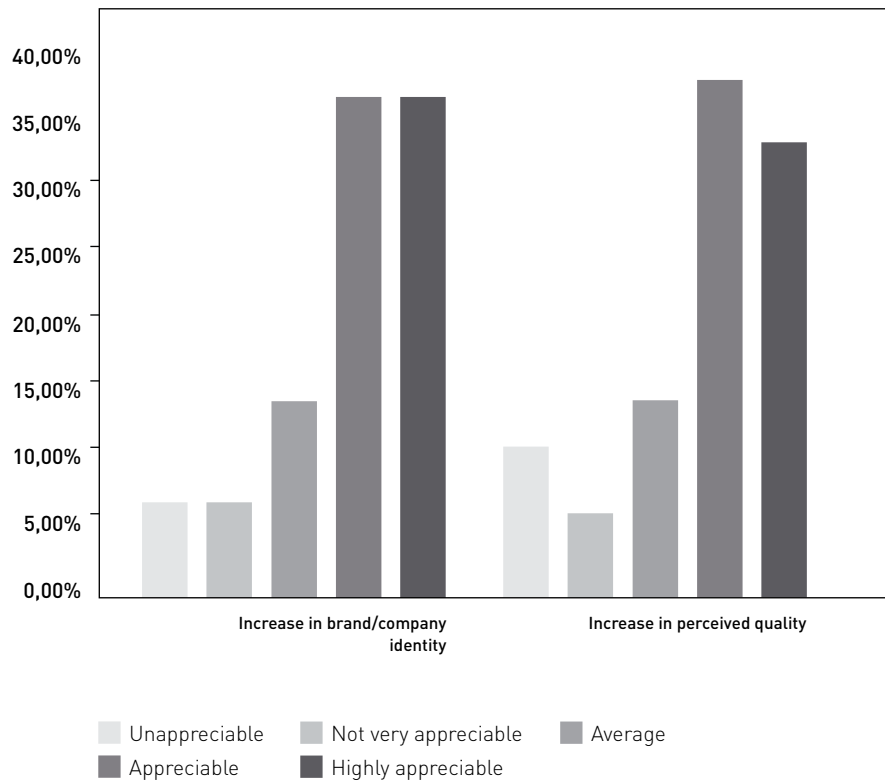
- Unrealistic designs
- Good designs from a graphic representation point of view but not very well adapted to the needs and production capacities of the companies.
- Designs that do not match the initial specifications.

In general, companies are seen to lack extensive experience or tradition in hiring designers or design and product development teams.

Aspects related to the product design process

The design process is not seen as an isolated activity but is integrated within the product development process and has numerous interactions with other activities concerning product development. In most companies a need is observed to improve processes, as well as generate greater levels of efficiency that lead to better results over a shorter period and at lower costs. In other words, companies really do have a long way to go in

Figure 4. Intangible benefits deriving from the application of design.



improving their processes and procedures that can later have an impact on the company's results.

Below we note some of the findings related to this area: Most firms (54.5%) state that product design costs do not exceed 5% of the total cost of product development (Fig.5). The reasons for this situation could be a consequence of the difficulty in separating design activities from design within the project.

Another reason might be the companies' reluctance to apply techniques, methodologies and tools that entail a

high degree of scope and extension, particularly with regard to creativity and innovation.

The low expenditure within the total product development costs reduces the possibilities of extending activities related to strategic aspects, creativity and conceptualisation.

In general, I believe that this figure of 5% design costs should be increased in order to achieve more evident and definite results, which could lead to an increase in competitive advantage.

- The product development times are generally short, most companies employing periods of less than one year for design and development (64% of the firms consulted). This situation reveals that companies are benefiting from the current dynamics related to product launches (Fig.6)
- Most of the companies consulted (over 62%) amortise their investment in new product development and design over a maximum period of two years (Fig.7).

In general, the returns on investment in design are fast and, in all cases, could be extended over longer periods, incorporating greater investment without significantly affecting product costs. All this could directly influence the attainment of products with design solutions that are more highly differentiated and innovative.

Opinions of different professionals

The opinions conveyed by professionals are more horizontal in nature and not as vertical as those of the companies, which are normally highly focused on a very specific sector and on highly specific products.

Below I explain some of the aspects I believe are the most significant:

- In general, companies still do not see design as a strategic factor.
- Companies still believe that design activities are a purely aesthetic issue.
- Another common point: many firms suppose there is a need to include design factors but do not know how to structure them, due to the fact that they do not have enough experience or the necessary specific knowledge.

Figure 5. Design cost compared with the total new product development cost.

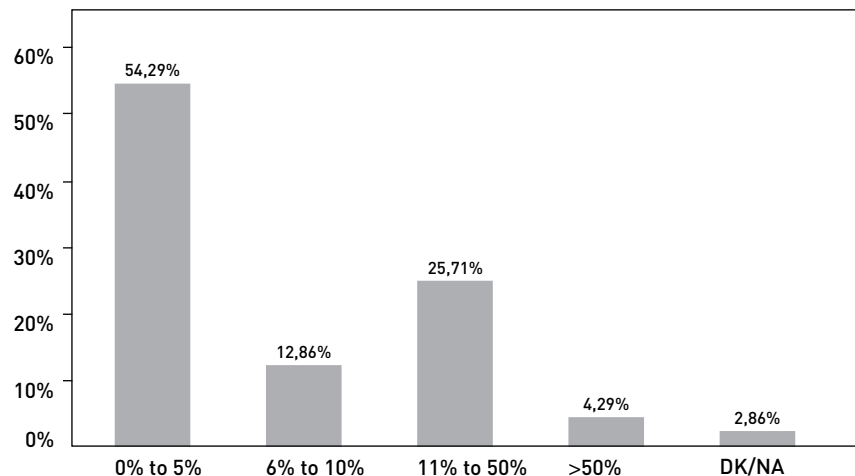


Figure 6. New product development period.

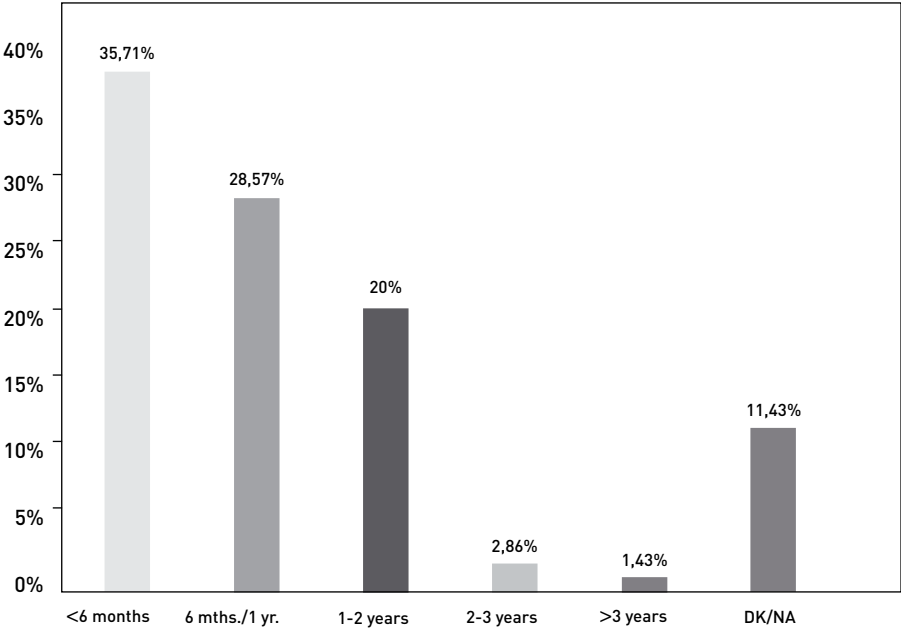
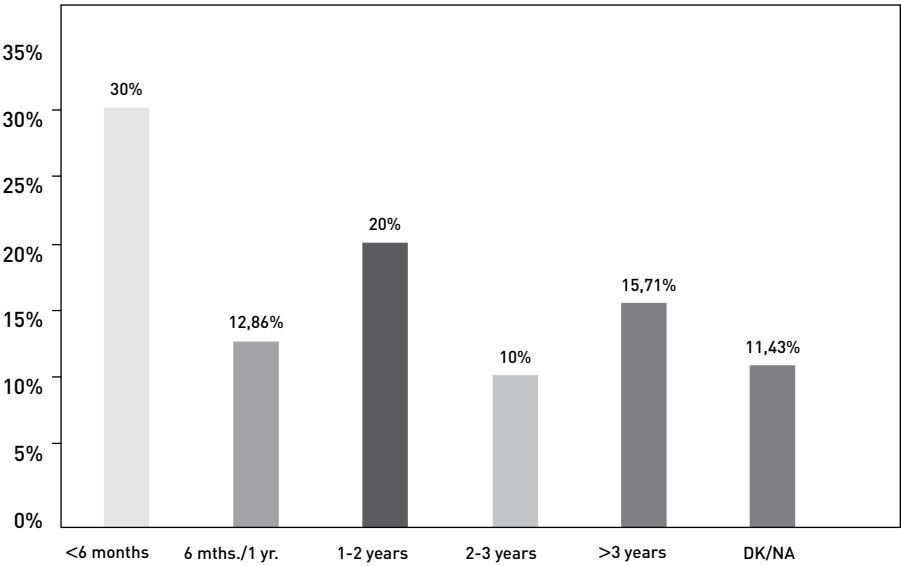


Figure 7. Period for return on investment.



They also mention the fact that it is difficult for companies to classify and evaluate product design factors *per se*.

In general, they agree that companies lack their own design culture applied to the product and note the absence of an appropriate organisational and management structure to achieve greater performance regarding product design activities. There is no evident concern among companies to introduce or consolidate their own product design activities.

Conclusions of the comments of the study

The comments of the study on market success and design refer to companies that are successful and cover a highly specific segment of the Catalan industrial fabric, but it has been observed that truly applying design in an organised way and with a structured process within new product development can lead to an increase in exports and profits and can strengthen intangible aspects which can indirectly affect the company's results.

It has been observed that, in the companies consulted, there is still a long way to go to intensify and improve aspects related to design and innovation, thereby helping to achieve greater competitive advantage.

The companies interviewed will have to strive even further to stay in their markets, increasing investment and resources, both material and human, to remain competitive and going much further into design and innovation.

The activity carried out by the companies contained in the study is a point of reference for SME's fighting to remain competitive, which must unavoidably incorporate competitive advantages in their products in order to guarantee their survival in the medium-term.

Final considerations

The urgent need to improve productivity and competitiveness in Spanish firms means that more must be done in the field of design and innovation, as these are two interrelated and decisive factors within all competitive strategy of companies producing manufactured goods.

This phase is and will be more difficult than any previous one. It is not enough to invest in resources: the culture of product design and innovation must be strengthened. But this is no easy task; time is required and neither is this an activity to be carried out by companies alone but rather public and private institutions must also be involved, as well as training centres at different levels and orientations and

the media; in other words, the whole of society, because we cannot allow our industrial fabric of manufacturing firms to be reduced to a shadow of its former self.

I still believe we have room for manoeuvre but there isn't much time left to react. Consequently, companies must first apply specific project methodologies and technologies more intensively and effectively (with greater range, scope and depth, as there is evidence to suggest that their current use is not very generalised), thereby achieving improved performance and a subsequent increase in competitiveness and productivity as a result of ongoing improvement, and where design would play a significant part. This new situation would enable sufficient margin (without trauma or loss of competitiveness) to act in parallel in specific innovation activities (incremental or immobilising), to allow a better competitive position in the medium term that guarantees

our industrial fabric is maintained, without the need to be so focused on productivity.

These approaches should lead indirectly to an overall consolidation of knowledge and a culture of product design and innovation that is more committed and more widely accepted by society at large.

To end, I would like to repeat what Tacitus said more than 2000 years ago: "difficulty is material to action". Consequently, this is a time for reflection but with a definite will to break with the old paradigms, to revise and question previous actions and to prepare a strategy that allows for consolidation in products incorporating factors of a strongly innovative nature, particularly within the context of design. In other words, we must strive to find opportunities and, to this end, we need to reinforce a culture of effort, where the strengthening of design will be one of the valid ways to achieve this end.

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